

REMARKS

Claims 1-22 were pending in the present application. Claims 9 and 22 have been canceled, leaving Claims 1-8 and 10-21 for consideration in the present amendment.

Reconsideration and allowance of the pending claims is respectfully requested in view of the following remarks.

Claim Rejection Under 35 U.S.C. §112

Claims 1-22 stand rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Applicants respectfully traverse this rejection.

The Examiner's general position is that the specification fails to enable an ordinary artisan to practice the invention commensurate in scope with the claims without undue and risky experimentation since gas mixtures of hydrogen and oxygen can be explosive. Applicants respectfully traverse and submit that one of ordinary skill in the art would be enabled to practice the invention as claimed.

First, it is submitted that an analysis for enablement does not take into consideration whether the experimentation is risky or not. Rather, the MPEP is quite clear in stating that the test for enablement is whether the experimentation needed to practice the invention is undue or unreasonable. In other words, the test for enablement is whether one reasonably skilled in the art could make or use the invention from the disclosures in the patent coupled with information known in the art without undue experimentation. Applicants submit that there is sufficient disclosure in the application that, when coupled with what is already known in the prior art, allows one reasonably skilled in the art to practice the invention. The invention is directed to the use of neutral plasma, i.e., about equal amounts of atomic hydrogen and atomic oxygen species, for removing polymers and residues from a substrate. As noted by the Examiner, there are numerous prior art references generally available to those skilled in the art describing explosive compositions of hydrogen bearing compounds with oxygen. Coupling what is already known in

the prior art with the teachings provided in Applicants' disclosure enables one of ordinary skill in the art to practice the claimed invention.

For example, the Examiner refers to US Patent Nos. 5,773,201 and 6,323,121 to teach that it is generally known that a gas mixture of more than 3% of hydrogen in oxygen gas can potentially cause an explosion during plasma forming conditions. The Examiner also refers to Hawley's Condensed Chemical Dictionary and the Handbook of Organic Solvents to highlight various hydrocarbon compositions that are potentially explosive. All of these references are readily available to those of ordinary skill in the art of plasma ashing, which when coupled with the disclosure provided in Applicant's application satisfies the enablement requirement as set forth in 35 USC §112, first paragraph.

It is not believed that the Examiner's amount of time required to locate these references was excessive. For similar reasons, it is not expected that one of ordinary skill in the art would spend inordinate amounts of time to research the explosiveness of various gas mixtures that could potentially be used to generate about equal amounts of hydrogen species and about equal amounts of oxygen species.

To further emphasize these points, Applicants refer to MPEP §2164.01, which sets forth the various factors that should be considered in a finding of undue experimentation. Contrary to the Examiner's assertion in the Office Action (Paper No 5, page 6), the level of risk is not a factor in determining whether the amount of experimentation is undue or not. In fact, according to MPEP §2164(c), the applicant need not demonstrate that the invention is completely safe (see also MPEP §2107.03). Specific factors that are to be considered in determining whether or not the experimentation required is undue are:

- (1) the breadth of the claims;
- (2) nature of the invention;
- (3) the state of the prior art;
- (4) the level of one of ordinary skill in the art;

- (5) the level of predictability in the art;
- (6) the amount of direction or guidance presented;
- (7) the existence of working examples; and
- (8) the quantity of experimentation needed to make or use the inventions based on the content of the disclosure.

With regard to the above noted factors, the Examiner must consider all of the evidence related to each of these factors, and any conclusion of non-enablement must be based on the evidence as a whole. In the present case, there is substantial disclosure provided in Applicants' application regarding direction and guidance. For example, Applicants' Figure 1 and the accompanying description in the specification at pages 6 and 7 clearly support and provide a clear and unambiguous definition of neutral plasma in contrast to reducing plasmas and oxidizing plasmas. In a preferred embodiment, the neutral plasma is described as one having about equal amounts of hydrogen atomic species and oxygen atomic species. Applicants respectfully submit that one of ordinary skill in the art of plasma ashing will recognize what is meant by neutral plasma upon reviewing Applicants' Figure 1 and upon reading the appropriate sections of the specification. With regard to suitable compositions, neutral plasma is formed from a gas mixture of hydrogen bearing compounds and oxygen, which can be used to provide about equal amounts of atomic hydrogen and atomic oxygen species in plasma forming conditions. Moreover, Applicants disclose various suitable hydrogen bearing gases including water vapor, ammonia, hydrogen, hydrocarbons e.g., methane, ethane, propane, hydrofluorocarbons, and the like. (see Applicants' specification, pages 7-8).

Moreover, it should be noted that the level of one of ordinary skill in the art of plasma ashing likely has greater than 5-7 years relevant experience and most likely has an advanced degree, typically, a doctorate degree. Because of this high level of skill in the art at the time the invention was filed, those skilled in the art would find the disclosure enabled when coupled with what is already known in the prior art. As noted and demonstrated by the Examiner, the explosiveness of various hydrogen bearing and oxygen compositions are well known. Certainly,

one having the above noted educational background and experience level would be able to determine which compositions are potentially explosive without the need for any experimentation. All that is required is a review of the literature, which is likely routinely practiced by those skilled in the art. Moreover, it is unlikely that the quantity of experimentation would be found to be excessive as a result of the search results. Neutral plasma is well defined in the application and guidance is provided therein for selecting suitable gas mixtures that form neutral plasmas. Because of this, one of ordinary skill in the art would not require undue experimentation to obtain gas mixtures needed to practice the invention.

In summary, Applicants' claims are consistent with and enabled by the specification. No undue experimentation is required in view of the existing prior art teachings and the level of skill for one of ordinary skill in the art. Accordingly, Applicants respectfully request reconsideration and allowance of Claims 1-22.

Claim Rejection Under 35 U.S.C. §102

Claims 1-3 and 9-22 are rejected under 35 USC 102(b) as allegedly anticipated by US Patent No. 6,242,350 to Tao et al. (hereinafter "Tao"). Applicants respectfully traverse.

Tao generally describes a post gate etch cleaning process. In one embodiment, Tao describes removing veil polymer with plasma formed from a O₂/N₂/H₂ gas mixture at a low temperature, and the photoresist and sidewall polymers at a higher temperature. As described by Tao, the amount of hydrogen in the gas mixture "is conveniently and safely provided by using forming gas, which comprises nitrogen with between about 5 and 10 percent added hydrogen." (see Col. 7, ll. 1-4). The gas flow includes flowing O₂ between 1,800 and 2,200 sccm and forming gas, presumably between about 5-10 percent added hydrogen, at a flow rate of between about 360 and 440 sccm. (Col. 7, ll. 19-22). In fact, the example provided by Tao employs an O₂ flow rate of 2,000 sccm and a forming gas flow rate of 400 sccm. The example is silent as to the concentration employed, but presumably is between about 5-10 percent hydrogen with the remainder being N₂.

To anticipate a claim, a reference must disclose each and every element of the claim.
Lewmar Marine v. Varient Inc., 3 U.S.P.Q.2d 1766 (Fed. Cir. 1987).

Tao fails to anticipate Claims 1-3 and 9-22 because Tao fails to teach the use of a neutral plasma. Rather, Tao teaches the use of an oxidizing plasma. The gas flow rate as taught by Tao consists of between 1,800 and 2,200 sccm O₂ and forming gas at a flow rate of between about 360 and 440 sccm. (Col. 7, ll. 1-22). Based on the disclosed flow ratios of forming gas and O₂, it is clear that the amount of atomic oxygen species would be much greater than the amount of atomic hydrogen species even if the maximum amount of hydrogen (10%) taught by Tao is considered.

Accordingly, Tao fails to anticipate the use of a neutral plasma and as such, the rejection applied to Claims 1-3 and 9-22 should be withdrawn.

Claim Objection

Claim 9 is objected to as being an improper dependent claim for failing to further limit the subject matter of a previous claim.

The objection to Claim 9 has been rendered moot in view of the cancellation thereof.

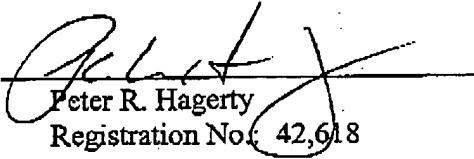
It is believed that the foregoing amendments and remarks fully comply with the Office Action and that the claims herein should now be allowable to Applicants. Accordingly, reconsideration and allowance is requested.

If there are any additional charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130 maintained by Applicants' Attorneys.

Respectfully submitted,

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